EINSTEIN™

The Einstein™ E640 Flash Unit by Paul C. Buff, Inc.™

USER MANUAL

v.7/2014

EINSTEIN™ SAFETY WARNINGS

Paul C. Buff™ Flash Units are designed for professional photographic use. As with all electronic equipment, users must observe all warnings and safety precautions. Carefully read all operating instructions and safety instructions before use.

WARNING! HIGH VOLTAGE! Flash units contain high voltages and internal components that can store dangerous voltages, even when the units are unplugged.

WARNING! Do not leave a flash unit unattended when it is turned on and / or in use. As with all electric equipment, close supervision is necessary. Do not allow unattended children around this equipment as potentially dangerous conditions may result. Turn the system OFF and unplug the power cord when not in use.

WARNING! Do not operate or store a flash unit in or around water. Do not operate the units in wet, damp or moist conditions, or in environments where water or other liquid could be dropped, splashed, sprayed or spilled on the unit. High voltage equipment can cause electric shock when operated in or near water. Your flash unit should only be used in dry, moderate conditions where the equipment is protected from rain, dirt, sand and dust.

WARNING! Do not use any Paul C. Buff, Inc.™ equipment without permission in restricted areas.

WARNING! Do not operate a flash unit on or around flammable materials such as newspaper, carpet, wood sawdust, gasoline, etc. Keep the unit away from fire, flames, and heated surfaces.

WARNING! Do not cover the unit during operation. Air circulation must be permitted. Do not obstruct ventilation holes by covering the unit while in use or by operating from inside a carrying bag.

WARNING! Do not insert any foreign objects into any ventilation holes. Do not carry or store a flash unit together with necklaces, hair pins, nails, paper clips, or any other small metal objects.

WARNING! Do not use ungrounded power cords, power outlets or power strips. Paul C. Buff™ Flash Units may only be connected to 3-wire grounded AC outlets to avoid shock hazard. Do not connect the unit to an ungrounded outlet or to a two-wire extension cord or adapter that eliminates the ground prong. Do not use any cords that have been damaged.

WARNING! Paul C. Buff™ flash units contain no user-serviceable parts. Never open, disassemble, or attempt to repair any components. Only qualified technicians should service the system as incorrect disassembly can create an electric shock hazard. Fingers and other foreign objects must never be inserted or dropped inside any of the vents. If the unit has been dropped or damaged, discontinue use and contact Customer Service. Do not attempt to make any changes or modifications as any modifications made, outside of those performed or approved by Paul C. Buff, Inc.™, may present hazardous conditions and void the warranty. *The only user-replaceable components are the unit's flashtube and modeling lamp.*

WARNING! Do not use adapters on the power cord to connect to power lines / outlets of incompatible voltages. This can damage the unit. *For use in international locations, see page 21.*

WARNING! The faceplate can get very hot during use. While in use, the unit's faceplate, flashtube(s), modeling lamp(s) and faceplate accessories (such as reflectors, grids and umbrella poles) can get very hot to the touch, remaining hot even after the unit has been powered down. Heat is intensified when the unit is used in down-angle positions and/or when used with accessories that trap heat (such as closed softboxes). Disconnect the unit from its power source and allow ample time for the equipment to cool down before touching any component or any accessories.

EINSTEIN™ SAFETY INSTRUCTIONS

1. Always mount the flash unit on a light stand during use. Before attempting to operate the flash unit, make sure that it is securely mounted to a light stand. We offer various light stands in assorted sizes - visit our website to learn more (*www.paulcbuff.com*). The stand mount is compatible with most standard light stands having top couplers up to 5/8-inch in size.

2. Remove the shipping cover before use. Remove the front black cover before turning the unit on.

3. Do not touch the flashtube or modeling lamp with your bare hands. When replacing the flashtube or modeling lamp, never touch a tube or lamp with your bare fingers. Always turn the unit off, unplug it from its AC power source, allow it to cool, and use a clean cloth or insulating gloves to remove or replace a tube and/or lamp. Do not allow your finger oils to contact the lamps as this can cause excess heat buildup and may cause premature flashtube or lamp failure.

4. Only use approved flashtubes and modeling lamps. The Einstein™ unit should only be used with the original flashtube and modeling lamp or an approved replacement tube or lamp. Please see our website (*www.paulcbuff.com*) to find replacement flashtubes and modeling lamps.

5. Use care when traveling with or transporting your flash unit. Always use the shipping cover provided to protect the flashtube, modeling lamp, and frosted dome cover. Use appropriate packaging to protect the unit against bumps and jolts that may damage the components.

6. When not in use, Paul C. Buff™ Flash Units should be stored in moderate climate conditions between 32ºF and 140ºF (0ºC and 40ºC), protected from water, dirt, sand and dust. Modern electrolytic capacitors normally have a long shelf life. However, if there is no charge applied for long periods of time, they are more likely to have increased leakage current. This means the capacitors may become warmer than normal until they stabilize, and the charge voltage may sag more quickly during use, causing the units to recycle more frequently after firing. If you need to store the unit for long periods of time (one year +), it is a good idea to occasionally turn the units on at their lowest power setting, and slowly increase the power setting over a period of 60 to 90 seconds while firing the unit using the TEST button after each increase.

EINSTEIN™ SAFETY INSTRUCTIONS continued

7. Paul C. Buff™ Flash Units are designed for use with Paul C. Buff™ accessories. While other manufacturers design flash equipment and accessories that may claim compatibility with Paul C. Buff™ equipment, each manufacturer defines their own contacts and latching mechanisms which may or may not be suitable for safe use with Paul C. Buff™ equipment. We cannot guarantee or offer our warranty when our equipment is used with accessories made by other manufacturers and cannot accept liability for damages that may be caused as a result.

8. Observe power requirements and use the appropriate power cord. The Einstein™ flash unit requires a suitable AC power source, but may be used on various power lines worldwide, from 95 to 265 Vac with 50 or 60 Hz outlets. The unit accomodates different line voltages without the need to change settings or modeling lamp type. For use in North America, the unit arrives with a 15-foot power cord that has a standard IEC connector on one end and a grounded, three-pronged male plug on the other. This power cord connects to the flash unit on its back control panel and is then plugged into a suitable 120 Vac, 50-60 Hz power outlet. To use the Einstein™ unit in other areas of the world with varying power outlet configurations, you will simply need an IEC power cord with the correct plug configuration specific to that area. A suitable cord can be purchased locally, found in electronic and computer stores.

9. When shooting in an environment where a suitable AC power source is not available, we recommend the exclusive use of our Vagabond™ Portable Power Systems. The Vagabond™ systems are designed specifically for Paul C. Buff™ flash units and power packs, offering a convenient, lightweight, self-contained portable power source. We currently offer Vagabond™ models in both 120V and 230V models. Visit our website (*www.paulcbuff.com*) to learn more.

EINSTEIN™ SPECIFICATIONS

Weight	4 pounds, 3.5 ounces *(without power cord)*
Dimensions	4.8” H by 4.8” W by 5.7” L *(body dimensions without lamps or mounting hardware)*; 7” H by 5.4” W by 7.8” L *(overall dimensions with lamps, dome and mounting hardware)*
Power	operates from 95 to 265 Vac, 50/60 Hz with no lamp change or user settings; supplied with 120V U.S. standard IEC power cord *(see page 21 for info on international use)*
Flashpower	640 true wattseconds / joules at Full Power *(maximum)* 2.5 true wattseconds / joules at 1/256 Power *(minimum)*

Flash Variability *(informal term)*	9 f-stops in precise 1/10f digital steps (Full to 1/256 power); voltage and IGBT time regulated to <1%; accuracy is +/- 1/10f from Full to 1/128 power, +/- 2/10f at 1/256 power
Recycle	1/10 to 1.7 second recycle at 120 or 240 Vac *(may be fired before 100% recycle for speed shooting at reduced power)*; switchable audible and visual recycle ready indicators
Modeling Lamp	250 Watt, 120 Vac bayonet-style quartz lamp supplied *(no lamp change needed when operating from 120 or 240 Vac)*; proprietary voltage regulation for constant lumen output over entire input voltage range *(lamp cannot reach full brightness at AC voltages below 115 Vac)*; model lumens track flashpower typically within +/- 1/10f over entire range
Flash Duration	1/2000 second t.5 at Full Power; t.1 duration varies from 1/588 to 1/13500 second in **Action Mode** and 1/588 to 1/8000 second in **Constant Color Mode** *(see page 12 for more)*
Color Temperature	5600° K +/- 50° K over entire range in **Constant Color Mode**; 5600° K to 6300° K in **Action Mode** *(see page 12 for more)*
Slave Tripper	flash-sensitive slave tripper *(enabled or disabled via menu)*
Reflector / Accessory Mount	quick-release levers on both sides securely hold standard Paul C. Buff™ / Balcar accessories and allow rotation with improved gripping and ease of operation
Umbrella Mount	top-mounted umbrella tube and clamp mounts umbrella shafts up to 9mm (0.350") diameter
Light Stand Mount	reversible swivel mount with ratchet handle; mounts on light stands with top couplers from 1/2" to 5/8"
Thermostatic Fan Cooling	high-velocity fan and ample cooling path directs air through the electronics and past the lamp and tube for high volume shooting; multiple overheat and overvoltage sensors
LCD Display	backlit, high-res 2.4" color LCD display (320 x 240 pixels)
Camera Sync	1/8" (3.5mm) jack; or fires from optional CSXCV Transceiver / Cyber Commander™ remote or third-party radio triggers ***The sync circuit is galvanically isolated from the AC line, high volage circuitry and the control power supply, making it nearly impossible to damage a camera even if the flash unit fails.***

EINSTEIN™ DIAGRAM

1. The **FUNCTION** button is used to scroll between the individual screens on the LCD display to select which screen is active for adjustment (each "screen" is a section of the display; all nine screens are visible at all times). The screen actively selected for adjustment is highlighted in blue. The unit defaults automatically to the **Flash Adjustment Screen**.

2. The **ADJUST** buttons are used to adjust the light's various settings. Once a screen is highlighted for adjustment, the **ADJUST** buttons are used to raise or lower output (for the flashpower and modeling lamp) or to scroll through the options for the setting.

3. The **LCD Display** is a backlit, high resolution, color screen that is divided into nine sections / screens to display the current status of the various light settings.

4. The **Sync Jack** (1/8-inch / 3.5mm) is used for hardwired connection of the flash unit to your camera using the provided ABSC sync cord. ***Note:*** *Inserting a sync cord or dummy plug into the jack does not disable the slave photo sensor, which is toggled on and off in a control screen.*

5. The **EASY SET** button clears any programming and returns the unit to its default factory settings. *See page 8 for more details on* **EASY SET***.*

6. The **TEST** button allows you to test fire (flash) the unit.

7. The **Fuse Holder** takes a user-replaceable SR5-F type 8A fuse. A backup is provided in the event of a blown fuse. *See page 20 for more details.*

8. The **POWER** button turns the flash unit ON or OFF.

9. The **Power Cord Jack** is the connection point for the power cord. The unit arrives with a standard US cord (IEC connector to 3-prong North American plug), but you can use the unit in countries with different outlet configurations by purchasing a standard IEC power cord with a suitable plug for your location.

10. The **Stand Mount Tightening Knob** twists clockwise to secure your light stand's top coupler inside the stand mount. Twisting counter-clockwise releases the hold.

11. The **Stand Mount** accepts any light stand with a top coupler up to 5/8-inch in diameter.

12. The **Ratchet Handle** allows you to swivel the flash unit up or down, loosening for adjustment and tightening to hold the desired position. ***Note:*** *Pulling out on the handle allows you to alter its position in order to make adjustments without hitting the housing.*

13. The **Quick-Release Levers** (two spring-loaded levers, one on each side of the unit) cause the faceplate holding fingers to contract so that accessories can be added or removed. The fingers expand to hold accessories securely in place when the levers are released.

14. Four **Holding Fingers** (one in each corner of the faceplate) are used to securely hold compatible faceplate-mounted accessories in place on the flash unit.

15. The **Frosted Pyrex Dome** fits over the flashtube and modeling lamp. It equalizes their effective size and shape for modeling previews and also serves to reduce UV emission.

16. Four **Spring Clips** hold the frosted pyrex dome in place on the faceplate.

17. The **CyberSync™ CSXCV Transceiver** (optional, sold separately) drops into the receptacle on the top side of the unit, allowing the unit to be remotely controlled by the Cyber Commander™ remote control (also sold separately). All of the Einstein™ parameters can be adjusted remotely with the Cyber Commander™ and Transceiver setup.

18. The **Umbrella Tightening Knob** is used to hold an umbrella pole in place on the unit. The shaft accepts umbrella poles up to 9mm in diameter.

19. The **Micro SD Card Slot** is used for firmware updating. Updates can be downloaded from our website and installed via a standard Micro SD Card or MicroSDHC Card plugged into this slot. See the Einstein™ page on our website (*www.paulcbuff.com/e640.php*) for firmware updates.

20. The omnidirectional **Slave Eye Dome** detects flash to fire the unit in response.

INITIAL SETUP

1. Remove the shipping cover. The Einstein™ unit ships with a black shipping cover positioned on the faceplate over the flashtube, modeling lamp, and frosted dome to protect these items in transit. This opaque black cover must be removed before use. Any protective packing material around the frosted dome must also be removed. To remove the cover, slide either of the quick-release levers to retract the four faceplate fingers holding the cover. ***Note:*** *Do NOT replace the shipping cover on a hot light. Allow the light to fully cool before installing the shipping cover.*

2. Place the flash unit on a light stand. Place the Einstein™ unit on a standard light stand with the stand's top coupler placed inside the Einstein™ stand mount. Secure the hold by twisting the stand mount tightening knob on the Einstein™ unit clockwise. Loosen the ratchet handle to swivel the flash unit up or down. The handle has a ratchet action: pulling out on the handle allows you to alter its position in order to make adjustments without hitting the housing.

3. Connect the supplied power cord. Connect the provided power cord into the power cord jack on the back panel of the flash unit, then plug the cord into a 120 Vac or 240 Vac, 50 or 60 Hz outlet, or to a Vagabond™ system. The Einstein™ unit will automatically sense the voltage and frequency. Press the **POWER** button to turn the unit on. ***Note:*** *When the Einstein™ unit is turned off, it's actually in STANDBY mode and can be turned on remotely by a Cyber Commander™ remote if it is fitted with a CSXCV CyberSync™ Transceiver (both optional accessories, sold separately - see page 18 for more details).*

4. Begin in EASY SET Mode. The recessed **EASY SET** button allows instant setup for most users. Pressing this button clears any special programming and sets the Einstein™ unit to the following parameters (how the unit is shipped from the factory):

Model Mode = TRACK Flashpower: The modeling lamp tracks the flashpower output (brightening or dimming automatically as the flashpower is adjusted up or down) for a "What You See Is What You Get" modeling preview.

Recycle / Ready Indication = BOTH (Audible and Visual Recycle Indication): Recycle indication is provided by an audible beep and by the modeling lamp dimming during recycle, then restoring brightness when recycle is complete.

COLOR **Color / Action = COLOR Mode:** The emitted color temperature is held constant at 5600°K plus or minus 50°K at any power setting or input voltage. *See page 12 for more details.*

ON **Slave Eye Status = ON:** The slave eye flash sensor is turned on.

CH 01
FREQ 01 **Channel / Frequency:** The optional CSXCV CyberSync™ Transceiver, if present, is set to Frequency 1 and Channel 1. *The CSXCV is sold separately, part of the CyberSync™ remote control system - see page 18 for more details.*

remove the shipping cover

place on a light stand

connect power cord

EASY SET *mode*

connect supplied sync cord

optional CyberSync™ use

5. Sync your camera. With your camera synced to the Einstein™ flash unit, pressing your camera shutter will trigger simultaneous firing. For a hardwired sync, use the provided ABSC sync cord (1/8-inch to PC-connection). Connect the 1/8-inch miniplug on the sync cord to the sync jack on the back panel of the Einstein™ unit, then connect the cord to your camera's PC jack or hot shoe adapter. When the cord is first connected, the unit should flash. Your camera can also be synced to the unit using our optional CSXCV CyberSync™ Transceiver (sold separately, used in conjunction with the CyberSync™ Cyber Commander™ or CST Transmitter). To learn more about the CyberSync™ system, visit our website (*www.paulcbuff.com/cybersync.php*). *See page 18 for more details on using the CyberSync™ remote control system.*

PRELIMINARY TESTING: With the Einstein™ unit turned on, operating the up and down **ADJUST** buttons should increase or decrease both the flashpower and the modeling brightness by 1/10f per click. If you hold either button in, the output will scroll.

DISPLAY FUNCTION: As you adjust the power using the **ADJUST** buttons, you should see the flash and model bargraphs on the LCD display go up or down correspondingly. Since **EASY SET** defaults the modeling lamp to track the flashpower, both bars should move in unison. If you press the **TEST** button at any power, the unit should flash and the modeling lamp should dim. When the unit is recycled, the modeling lamp will return on (at its previous brightness level) and the audible recycle indicator beep will sound.

NAVIGATING EINSTEIN™ PARAMETERS

With the **EASY SET** button, most simple Einstein™ shoots are plug-and-play, not requiring parameter adjustments other than flashpower. For more advanced shoots, all parameters may be easily manipulated using the different screens on the LCD display.

The LCD display is divided into nine sections / screens. The actively selected screen is highlighted in blue, beginning with the default **Flash Adjustment Screen**. Pressing the **FUNCTION** button will sequence through the screens. If no adjustments are made for 10 seconds, the display will revert to the default state with the **Flash Adjustment Screen** active. Regardless of which screen is selected, the flashpower and modeling lamp bargraphs are always visible in the left column of the display. These bargraphs indicate the power, relative to full power, in 1/10f increments. The white bargraph (indicated by the lightning bolt symbol) displays the flashpower and the yellow bargraph (indicated by the bulb symbol) displays the modeling lamp output. As adjustments are made, both the bargraphs and the digital parameters in the **Flash Adjustment Screen** and **Model Adjustment Screen** will update.

THE LCD DISPLAY

A. The **Flash Adjustment Screen:** When this screen is active, the **ADJUST** buttons are used to raise or lower flashpower at 1/10f per click (holding either button scrolls the flashpower up or down). At any flashpower setting, the digital numerical display in the screen indicates all flash data: the current flashpower relative to full power, the color temperature, the t.1 flash duration, the EU number, and the wattseconds. As adjustments are made, the data will change and the flashpower bargraph will move up or down accordingly. If the modeling lamp is set to track the flashpower, the numerical data in the **Model Adjustment Screen** will change and the modeling lamp bargraph will move up or down as well.

B. The **Model Adjustment Screen:** This screen allows modeling lamp adjustment in either the independent adjustment mode or tracking mode. In the independent adjustment mode, the **ADJUST** buttons may be used to raise or lower the modeling brightness. The digital display of watts and f-brightness relative to full (250 W) will update.

C. The **Model Mode Screen:** When this screen is active, you may select between the four modeling lamp modes by pressing the **ADJUST** buttons.

ON **On (Full Power):** the modeling lamp remains at full brightness

Independently Adjustable: the modeling lamp is adjusted independently of flashpower

Track Flashpower: the lamp tracks the flashpower

OFF **Off:** the modeling lamp is off

The Flash Adjustment Screen (A):

-1.0f: current flashpower, relative to full power

5750 K: color temperature

'2041 t.1: t.1 flash duration (in fractions of a second)

EU 5.7: EU number

320 WS: flashpower output in true wattseconds

The Model Adjustment Screen (B):

-1.0f: current modeling lamp output, relative to full power

125 W: modeling lamp output in watts

When the modeling lamp is set to track the flashpower, there is a provision in the **Model Adjustment Screen** to offset the lamp brightness, setting the output higher or lower (not exceeding the normal minimum or maximum for the installed lamp), while still maintaining the tracking feature. The bargraphs will still move in unison, but with an offset between the bars. This feature is useful when the light is used with other lights having lower wattage lamps, and it is desirable to maintain a constant ratio of model brightness to flashpower for accurate previews. For example, if an Einstein™ unit is used with an AlienBees™ B1600 unit (640 Ws, 150 W lamp), it would be advantageous to set the Einstein™ unit such that its lamp also produces 150 W when set to 640 Ws.

D. The **Recycle / Ready Indicator Screen:** In this screen, the **ADJUST** buttons set the recycle indication behavior.

Audible: an audible beep sounds to indicate that recycle is complete; the lamp does not dim during recycle as this might be disconcerting to models

Visual: the modeling lamps will dim during recycle, then restore brightness when recycle is complete

Both: both indicators are activated

OFF **Neither:** both indicators are disabled; the ready status will be indicated only on the back LCD display (indicated by the **Recycle / Ready Indicator Screen** turning from red to green)

When the flashpower is lowered, the Einstein™ unit automatically dumps excess voltage. The screen turns red during dump, then back to green when ready.

E. The **Slave Eye Status Screen:** In this screen, the slave status is set with the **ADJUST** buttons.

ON **On:** the slave eye is on, causing the Einstein™ unit to flash simultaneously whenever it "sees" the flash from another unit (still active whether or not the sync jack is in use)

OFF **Off:** the slave eye is turned off

F. The **Action / Color Screen:** In this screen, the **ADJUST** buttons are used to change the mode between Action Mode and Constant Color Mode *(more details in the following section).*

G. Channel Screen and **H. Frequency Screen:** In these screens, the **ADJUST** buttons are used to set the channel and frequency of the optional CyberSync™ CSXCV Transceiver, if present. Each flash unit / transceiver in the setup should be set to its own unique channel. All flash units / transceivers should be set to the same frequency (s*ee page 18 for more details).*

IGBT ADVANTAGES

Even the most expensive professional monolight flash units usually control flashpower by varying the voltage applied to the flash capacitors. This simple and inexpensive method has three distinct limitations to the achievement of truly professional performance:

1. The range of power reduction is typically limited to 1/8 to 1/32 power, often resulting in an inability to achieve low aperture settings with close lighting techniques.

2. As power is reduced, the flash duration becomes longer - typically twice as long at minimum power relative to maximum power. The median t.1 flash duration of the ten most popular pro monolights ranges from 1/200 second to 1/400 second – too slow for sharp freezing of action in sports, dance and other rapid movement shots *(see graphs on page 15)*.

3. Color temperature typically varies by 75ºK to 80ºK per f-stop of power reduction, resulting in about 400ºK color difference between minimum and maximum power. The Einstein™ unit employs proprietary advanced digitally controlled IGBT technology to control flashpower. This results in an extreme range of power reduction (1/256 power) in precise 1/10f stops. As power is reduced, the t.1 flash duration also decreases dramatically instead of increasing. This technology allows the Einstein™ unit to maintain a constant color temperature throughout the entire 256:1 power range.

Two operating modes are provided – **ACTION Mode** and **CONSTANT COLOR Mode**. In Action Mode, the t.1 flash duration shortens rapidly from 1/588 seconds at full power to 1/13,500 seconds at minimum power for incredible action freezing capability, but the color temperature increases as power is reduced. In Constant Color Mode, the t.1 flash duration drops less rapidly, to a minimum of 1/8000 second, while maintaining a constant color temperature of 5600º K (+/- 50º K) throughout the entire power range. The internal processor controls the accuracy and repeatability with very high precision *(see the chart on page 13 and graphs on page 15)*.

ACTION Mode: In Action Mode, the color temperature rises as power is reduced, but the t.1 flash duration is minimized even further for maximum action stopping capability where absolute color consistency is secondary to motion freezing. At 1/2 power in Action Mode, the t.1 flash duration is approximately 1/2000 second and the color temperature is approximately 5750º K (absolute values of flash duration and color temperature are indicated on the rear LCD display).

CONSTANT COLOR Mode: In this mode, the emitted color temperature is held constant at 5600º K, plus or minus 50º K at any power setting or input voltage. At full power, the t.5 flash duration is 1/1600 second and the t.1 time is 1/568 second. As power is reduced to 1/2 power the color remains constant, while the flash duration decreases to 1/1351 second t.1 (note that with IGBT control, the t.5 spec is no longer meaningful, so only the t.1 flash duration appears on the rear LCD display). As power is further decreased, the color temperature remains constant and the t.1 flash duration falls ultimately to 1/8000 second at the lowest power settings.

ACTION MODE:

f-stop	Flash Duration (sec.)	Color Temp. (ºK)
Full	1/568	5600º K
-0.5f	1/1220	5650º K
-1f	1/2041	5750º K
-2f	1/4464	5950º K
-3f	1/6050	6150º K
-4f	1/10417	6350º K
-5f	1/11050	6450º K
-6f	1/11765	6450º K
-7f	1/12579	6400º K
-8f	1/13514	6400º K

CONSTANT COLOR MODE:

f-stop	Flash Duration (sec.)	Color Temp. (ºK)
Full	1/568	5600º K + / - 50º K
-0.5f	1/926	
-1f	1/1351	
-2f	1/2174	
-3f	1/3226	
-4f	1/4098	
-5f	1/5000	
-6f	1/5814	
-7f	1/6579	
-8f	1/8000	

EU Numbers: When lights with different wattsecond ratings are mixed in a studio, terms like "1/4 power" or "-3f" don't tell the user how much light one unit outputs compared to another. In order to allow a direct comparison between lights of different ratings, several European manufacturers have instituted a numbering system that directly compares lights in 1/10f increments without requiring calculations or wattsecond math conversions. The EU Number defines a 6400 Ws power level as EU10.0, and each 1/10 f-stop change is represented by a one digit change in the decimal. Thus, EU9.9 is 1/10f less power than EU10.0. A full f-stop change is a one digit change before the decimal point. If your main light is EU6.4 and your fill is EU5.3, you quickly know your fill light is 1.1f less powerful than your main light.

EU9.0	3200 Ws	**EU6.0**	400 Ws	**EU3.0**	50 Ws	**EU0.0**	6.25 Ws
EU8.0	1600 Ws	**EU5.0**	200 Ws	**EU2.0**	25 Ws	**EU-1.0**	3.13 Ws
EU7.0	800 Ws	**EU4.0**	100 Ws	**EU1.0**	12.5 Ws	**EU-2.0**	1.56 Ws

CONVENTIONAL FLASH VS. IGBT CONTROL

Conventional Variable Voltage Control: Figures 1 and 2 show the flash waveform from a conventional variable voltage monoflash. As power is reduced, both the t.5 and t.1 flash durations become longer as power is reduced. Note that even beyond the t.1 point the flash continues to trail off slowly, adding motion blur. The color temperature drops as power is reduced.

Einstein™ E640 IGBT Control: In Figures 3 and 4 below, notice the flash abruptly shuts off at whatever point is needed to produce the desired output. The t.1 flash durations can be as fast as 1/13,500 second at low power, producing crisp action freezing. But the color temperature rises as power is reduced. This depicts the Einstein™ Action Mode. In the Constant Color Mode, the Einstein™ processor compensates by adjusting both the shutoff time and the voltage such that a constant 5600°K color is achieved. The flash duration drops less rapidly as power is reduced, but still produces very short t.1 times (1/8000 second at minimum power) and extremely sharp action freezing. *See the graphs below and on the following page.*

Figure 1: Variable Voltage at Full Power

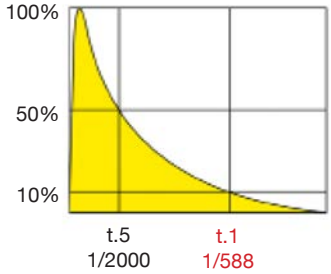


Figure 2: Variable Voltage at Half Power

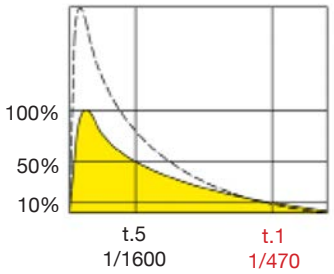


Figure 3: IGBT Control at Full Power

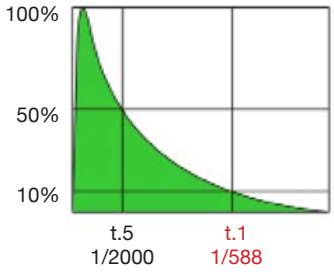
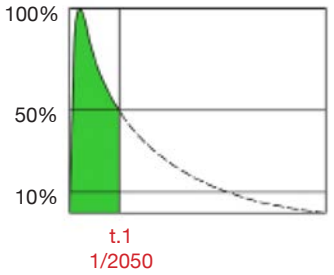
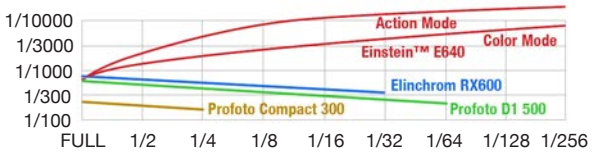


Figure 4: IGBT Control at Half Power



t.1 FLASH DURATION (Seconds) VS. POWER SETTING

Flash Duration (fractions of 1 second)

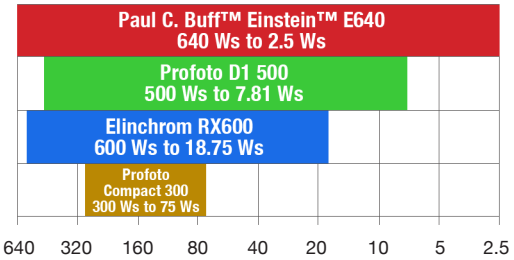


COLOR TEMPERATURE VS. POWER SETTING

Color Temperature (Kelvin)

POWER VARIABILITY RANGE (Wattseconds)

Total Range in True Wattseconds


Paul C. Buff™ Einstein™ E640
640 Ws to 2.5 Ws
Profoto D1 500
500 Ws to 7.81 Ws
Elinchrom RX600
600 Ws to 18.75 Ws
Profoto Compact 300
300 Ws to 75 Ws
640 320 160 80 40 20 10 5 2.5

(Graphs on pages 14 and 15 derived from published specifications and/or lab testing by Paul Buff)

EXPECTED OUTPUT

Full Power (640 Ws) with the 8.5" High-Output Reflector	f22 +1/10 at 10 feet (GN 234)
Full Power (640 Ws) with the 11" Long-Throw Reflector	f32 +6/10 at 10 feet (GN 394)
Full Power (640 Ws) with a softbox	f8 +7/10 at 10 feet (GN 102)

Readings taken at ISO100 in a 14' x 14' room with grey walls and floor. For details on expected output readings and measurements takes with other accessories and at other power settings, see our website (www.paulcbuff.com/output.php).

USING ACCESSORIES

All Paul C. Buff™ accessories are sold separately. *Visit our website (www.paulcbuff.com) to learn more and see our full line of compatible accessories and light modifiers.*

Remote Controls: The Einstein™ unit includes a slot for the CyberSync™ CSXCV Transceiver for use with the Cyber Commander™ remote control to provide complete wireless firing and parameter adjustment. With this setup, the Cyber Commander™ unit can be used to remotely power on an Einstein™ unit that is plugged into a power source. The unit may be used with all CyberSync™ transmitters and receivers *(see page 18 for more).* Einstein™ may not be used with the LG4X wired remote control or older Paul C. Buff™ remotes incorporating the telephone cord connection. The unit is compatible with most other third party triggering receivers (such as the PocketWizard®). A 1/8-inch to 1/8-inch non-attenuated mini male mono cord such as our CSSC is required to connect the receiver to the Einstein™ unit.

Softboxes and Reflectors: The Einstein™ faceplate with the standard BUFF™ / Balcar mount has four holding fingers that expand and contract to hold various reflectors as well as speedrings for softbox attachment. While the Einstein™ unit does not arrive with a particular reflector, for general use we recommend the 8.5HOR 8.5-inch high-output silver reflector. The unit is compatible with our full line of reflectors, beauty dishes, the LiteMod™ mainframe and associated accessories, and our foldable softboxes, octaboxes or stripboxes as well as retired models of Paul C. Buff™ softboxes.

Paul C. Buff™ CSXCV Transceiver

Cyber Commander™ and CSXCV

Paul C. Buff™ Einstein™ faceplate

umbrella mount

light stand mount

Paul C. Buff™ PCBBAG carrying bag

When using softboxes by other manufacturers, you will need to get a Paul C. Buff™ compatible speedring. When mounting accessories to the faceplate, ensure that all four holding fingers are within the opening and that the quick-release levers have returned firmly to the open position. Failure to do so can result in the unintended release of the modifier from the light.

Note: *The Einstein™ unit mounts all accessories that fit previous Paul C. Buff™ lights except the obsolete WL130, WL5,000 and WL10,000 models.*

The PLM™ System and Umbrellas: The Einstein™ unit has an umbrella shaft that runs along the top length of the unit housing, fitting standard umbrella poles up to 23/64" (approx. 9mm) in diameter. It may be used with the PLM™ system (both current and previous models) as well as retired Paul C. Buff™ umbrellas. The PLM™ system's on-axis speedring mount may be used as well.

Light Stands: The Einstein™ unit must be securely mounted to a light stand for use. The stand mount is compatible with most standard light stands having top couplers up to 5/8-inch and may be used on our full line of Paul C. Buff™ light stands.

Travel Gear: One Einstein™ unit can be carried in our PCBBAG Paul C. Buff™ single-light carrying bag (with the shipping cover, either the 7" or 8" reflector, cords and room for other small accessories). ***Note:*** *The PCBAG is for around-town travel only; it is not suitable for airline travel.* For consideration of travel cases from other manufacturers, the unit's dimensions are 7" height x 5.4" width x 7.8" length (with lamps, dome and shipping cover in place; mounting hardware attached).

If you need help or have questions about using a particular accessory with your Einstein™ flash unit, contact our Customer Service team for assistance.

USING EINSTEIN™ WITH THE CYBERSYNC™ SYSTEM

For complete wireless firing and full parameter adjustment, the Einstein™ unit can be used with the CyberSync™ CSXCV Transceiver and the Cyber Commander™ remote control. With this setup, the Cyber Commander™ unit can also be used to remotely power on an Einstein™ unit that is plugged into a power source. *For complete information about the optional CyberSync™ system, visit our website (www.paulcbuff.com/cybersync.php).*

Setting up the Einstein™ unit with the Cyber Commander™ remote: Unlike setting up vintage Buff™ lights in the Cyber Commander™ remote, it is not necessary to perform the tedious "Spec Lights" and "Light Settings" steps required by lights that communicate via CSR+ or CSRB+ receivers. The Einstein™ / CSXCV combination allows all of the Einstein™ unit's back panel settings to automatically be transferred to the Cyber Commander™ remote. Acquiring this information and recognizing Einstein™ units is accomplished by using one of the methods detailed below. ***Note:*** *Below, there are two instruction sets for setting up Einstein™ flash units with the Cyber Commander™ remote. The first set (***NEW SETUPS***) starts the setup process from scratch, erasing any programming already made in the Cyber Commander™ remote. Any information erased will have to be reprogrammed, including light specifications and names. To keep existing light information programmed in your Cyber Commander™ remote, please follow only the steps in the second section (***EXISTING SETUPS***).*

Einstein™ and CyberSync™ NEW SETUPS: Use these instructions to set up the Einstein™ unit as part of a new setup with no existing lights - *this will erase any information already programmed in the Cyber Commander™ remote!*

1. Using the **FUNCTION** and **ADJUST** buttons on the Einstein™ unit's back panel, ensure that the unit is set to a unique channel not shared by any other light / CyberSync™ receiver, and set to the same frequency as your Cyber Commander™ remote.

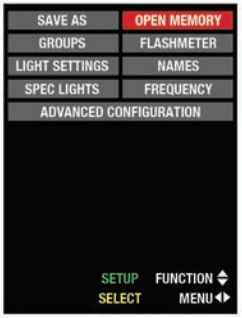
2. Enter the Cyber Commander™ remote's setup menu by scrolling to the right with the right joystick. In the setup menu, use the right joystick to highlight and select **OPEN MEMORY**.

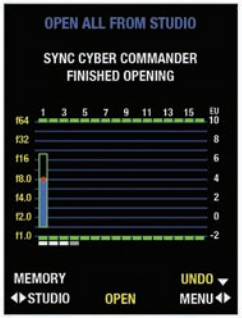
3. Using the left joystick, select **STUDIO** in the lower left corner. Your screen should now read **OPEN ALL FROM STUDIO**, followed by **SYNC CYBER COMMANDER FROM STUDIO LIGHTS**.

4. Press in on the right joystick. **SYNC CYBER COMMANDER FINISHED OPENING** should appear.

5. The Einstein™ unit is now defined as **Einstein 640** and the remote is set with all parameters for the unit as they appear on its back panel. No further action is required. Any parameter changes should now be made with the Cyber Commander™ remote as any changes made on the back panel will be overridden by the settings in the Cyber Commander™ remote.

Note: *All non-digital Paul C. Buff™ flash units (White Lightning™, AlienBees™, and Zeus™ units) will require the specification process as outlined in the Cyber Commander™ manual.*





Einstein™ and CyberSync™ EXISTING SETUPS: Use these instructions to set up the Einstein™ unit as part of an existing setup with flash units that have already been programmed and specified in the Cyber Commander™ unit - *already programmed lights will remain unaltered.*

1. Using the **FUNCTION** and **ADJUST** buttons on the Einstein™ unit's back panel, ensure that the unit is set to a unique channel not shared by any other light / CyberSync™ receiver, and set to the same frequency as your Cyber Commander™ remote.

2. Enter the Cyber Commander™ remote's setup menu by scrolling to the right with the right joystick. In the setup menu, use the right joystick to highlight and select **OPEN MEMORY**.

3. Using the left joystick, select the **CHANNEL** corresponding to the channel number you have set on the new Einstein™ unit that you are about to recognize. By opening new lights individually, one light channel at a time (instead of using **OPEN FROM STUDIO**), you will avoid losing any programming already performed for existing lights. Your screen should now read **OPEN CH(XX) FROM STUDIO**, followed by **SYNC CYBER COMMANDER FROM STUDIO CHANNEL (XX)**.

4. Using the right joystick, press in. Almost immediately, **SYNC CYBER COMMANDER FINISHED OPENING** should appear.

5. Repeat steps 3 and 4 to add other new Einstein™ flash units to the existing setup.

6. Each Einstein™ unit is now defined as an **Einstein 640** and the remote is set with all parameters for each unit as they appear on each back panel. No further action is required. Any parameter changes should now be made with the Cyber Commander™ remote as any changes made on the back panel(s) will be overridden by the settings in the Cyber Commander™ remote.

Note: *Once you have completed the process of adding new lights, it's always a good idea to store the new or revised setup to one of the 52 available storage locations for future reference. See your Cyber Commander™ manual for details on storage locations and saving setups.*

REPLACING EINSTEIN™ COMPONENTS

Certain components arriving with the Einstein™ flash unit are consumable and will require replacement based on normal use. ***All Paul C. Buff™ replacement components are sold separately.*** *Visit our website (www.paulcbuff.com) to learn more.*

Flashtube: The user-replaceable flashtube that arrives with the unit is a 12mm single-ring, UV-coated tube (daylight-balanced at 5600º K). This tube has a 200,000+ flash lifespan, dependent upon power levels and frequency of shooting. For future replacement needs, the part number is MAXFT12MMUV *(www.paulcbuff.com/flashtubes.php)*. Do NOT use any other tube.

Modeling Lamp: The user-replaceable modeling lamp that arrives with the unit is a bayonet-style 250 Watt modeling lamp, also having a lifespan dependent upon power levels and frequency of use. For future replacement needs, the part number is JD250W *(www.paulcbuff.com/modelinglamps.php)*. We also offer lower-wattage lamps in 150 Watt (part # QL150) and 25 Watt (part # 25W) models. When using the Vagabond Mini™ Lithium system, as the system cannot power the supplied 250 Watt modeling lamp, the 25 Watt lamp may be used for brief modeling previews. ***Note:*** *Never handle flashtubes or lamps with your bare hands.*

Fuse: The user-replaceable fuse holder (located on the back panel of the unit) takes an SR5-F type 8A fuse. Each unit arrives with this fuse in place on the unit and an additional back-up fuse is provided. If further fuse replacement becomes necessary, additional fuses may be purchased at electronic suppliers such as Digi-Key (*www.digikey.com, part # WK6240-ND*). ***Note:*** *If your fuse blows, first check the modeling lamp. Various factors can cause the fuse to blow, but the most common problem is a bad modeling lamp. If you find that the fuse requires replacement multiple times, contact us as there may be a problem.*

Should you misplace any other system components, we offer replacements for the power cord (part # UPC15), sync cord (part # ABSC), frosted dome (part # 1060836), and shipping cover (part # 1060203). Contact us for assistance.

MAXFT12MMUV flashtube

standard JD250W bulb

QL150 (left); 25W (right)

fuse holder

USING EINSTEIN™ ON GLOBAL POWER LINES

The Einstein™ flash unit offers global plug-and-play with automatic power switching that allows the unit to operate on power lines from **95 to 265 Vac, 50 or 60 Hz**, automatically sensing the voltage / frequency and adjusting accordingly with no user attention required. The unit can tolerate momentary power line voltages as low as 35 Vac from a Vagabond™ portable power system or from other similar pure sine inverter without crashing, whereas many competitive digital flash units crash if the input voltage falls below about 80 to 90 Vac. No user intervention or lamp changing is required to operate at different AC line voltages.

Note: *The Einstein™ flash unit's precision WYSIWYG modeling lamp tracking will not allow the modeling lamp to reach full brightness at input voltages below 115 Vac, but will still track at input voltages from 95 to 265 Vac.*

For use in **North America**, the unit arrives with a 15-foot power cord that has a standard IEC connector on one end and a grounded, three-pronged male plug on the other. This power cord connects to the flash unit on its back control panel and is then plugged into a suitable 120 Vac, 50-60 Hz grounded power outlet. For use in **Australia and China**, we offer an optional power cord, available in both 15-foot *(part # VM-UPC15-230V)* and 3-foot *(part # VM-UPC3-230V)* lengths *(both sold separately, visit our website at www.paulcbuff.com/powercords.php).*

standard Paul C. Buff™ UPC15 power cord (120 V, for use in North America)

international VM-UPC15-230V power cord (230 V, for use in Australia and China)

standard IEC connector

North American 120 V plug

standard IEC connector

Australia / China 230 V plug

To use the Einstein™ unit in **other areas of the world with varying power outlet configurations**, you will simply need an IEC power cord with a standard IEC connector on one end and the suitable plug on the other end with the correct plug configuration specific to your area. A standard power cord can be purchased locally, found in electronic and computer stores.

PORTABLE POWER

For portable, battery power, we recommend the use of our Vagabond™ Portable Power Systems. For reliable, portable, current-limited, true sine wave power, we offer the **Vagabond™ Lithium Extreme** system and the **Vagabond Mini™ Lithium** system *(visit our website at www.paulcbuff.com/vagabond.php to learn more about each system).*

EINSTEIN™ FIRMWARE

The Einstein™ has user-upgradable firmware which can both fix operational problems as well as add functions to the product. When your Einstein™ unit is first powered on, the firmware version will flash on the bottom of the screen for approximately 2 seconds. The firmware version can also be found on the diagnostics screen in the lower left corner. To ensure that you have the most up-to-date firmware for your unit, visit the Einstein™ product page on our website (www.paulcbuff.com/einstein.php) and see the FIRMWARE tab.

FREQUENTLY ASKED QUESTIONS

Q: My Einstein™ flash unit will not fire. I've tried triggering the flash and pressing the TEST button on the control panel, but neither will fire the unit. Is the flashtube dead? Is there a problem?

A: Do you hear a faint clicking sound when you press the TEST button? If so, most likely the unit simply needs a new flashtube. If it seems too soon for your flashtube to be exhausted, it is possible that it has come unseated or been damaged in transit. Do you see any cracks or breaks in the flashtube or flashtube legs? If you need to replace or reseat the flashtube, first turn the unit OFF and unplug it from its AC power source, waiting 5 minutes for the unit to cool. Wearing gloves or using a clean cloth, replace or reseat the flashtube, pressing down over each leg to ensure that the tube is fully seated. If replacing or reseating the flashtube does not solve the problem, contact our Customer Service team to further discuss and diagnose the situation.

Q: Why are other flash units causing my Einstein™ flash unit to fire?

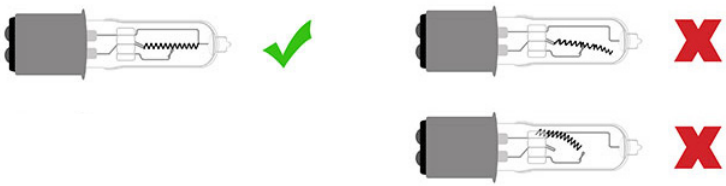
A: The Einstein™ unit has a slave tripper that will sense a flash of light (visible and infrared) and fire the unit simultaneously. Any flash that it "sees" can trigger it, including the flash from another unit in your setup, a conventional on-camera flash (and its pre-flash), and/or an infrared remote. While this gives you more options for triggering, the presence of extraneous triggers must be considered when you are not the only photographer in the area.The slave can be turned ON or OFF on the unit's back panel using the FUNCTION button to scroll to the Slave Eye Status Screen. The status can also be set on a Cyber Commander™ remote. ***Note:*** *Unlike first generation Paul C. Buff™ units, connecting a sync cord or dummy plug will NOT disable the slave. It must be manually disabled on the LCD display or via the Cyber Commander™ remote.*

Q: I made a change to a setting on the back panel of my Einstein™ flash unit, then when I went to take a photo, the settings reverted. Why didn't they stick?

A: Are you using a Cyber Commander™ remote? The Cyber Commander™ unit controls the settings for any flash units in the setup that have been specified with their associated receivers. The settings in the Cyber Commander™ unit override any manual adjustments made on the back panel of the unit.

Q: The fuse has blown on my Einstein™ E640 flash unit. What happened? How do I replace it?

A: If the fuse blows, the unit will power off and cease function. Various factors can cause the fuse to blow, but the most common problem is a bad modeling lamp. To check the modeling lamp, first disconnect your flash unit from its power source. If you have been using the unit, wait at least 5 minutes for the unit to cool before handling any components. Locate the fuse on the flash unit's back control panel (the fuse is a dark red color and has a clear circular case covering it). Twist left to unscrew and remove the clear cover, then remove the fuse by pulling it straight out, away from the unit. Next, on the flash unit's front faceplate, remove the frosted glass dome (if in place) in order to view the modeling lamp. Wearing gloves or using a piece of cloth or tissue, remove the modeling lamp by pressing in and twisting counterclockwise. Inspect the removed modeling lamp to determine if the lamp is bad and was the cause of the blown fuse. Look inside the clear envelope and locate the coiled filament. Ensure that the circuit is complete and that the coil and connecting wires are all properly connected and unbroken:



With the modeling lamp removed, replace the blown fuse with a new SR5-F type 8A fuse. Push the new fuse in place and replace the clear plastic cover. Each Einstein™ unit originally arrives with a spare fuse. If you do not have this fuse, you can purchase a replacement fuse at an electronic supplier such as Digi-Key (*www.digikey.com, see part # WK6240-ND*). With the new fuse in place (but with the modeling lamp still removed), plug in your flash unit and turn the power on. Use the TEST button to flash the unit. If the unit flashes normally with the new fuse, the problem was most likely the modeling lamp, even if the problem is not immediately apparent when viewing the lamp. Turn the flash unit off and replace the modeling lamp with a new lamp. If you replace the fuse and it blows again, even with the modeling lamp uninstalled, there may be an internal problem. Please contact our customer service team.

SATISFACTION GUARANTEE and FACTORY WARRANTY

The Einstein™ unit arrives with our **60-Day Absolute Satisfaction Guarantee**. If you are not satisfied with the system for any reason, you may return it within 60 days for a complete refund, minus the cost of shipping. In order to receive your full refund, ensure that all items originally arriving with the system are included in your return. The unit also arrives with our **2-Year Factory Warranty.** Paul C. Buff, Inc.™ guarantees to the original purchaser an individual product factory warranty against manufacturer defects in materials and workmanship, beginning with the date that the product is originally shipped to the customer.

Terms and Conditions of Warranty:

• This warranty is limited to the repair or replacement of a product or component that should become defective under normal use, as outlined in the product description and product manual.

• If, during the applicable warranty period, the product is found to be defective by Paul C. Buff, Inc.™, we will repair or replace the defective product with an equivalent model without charge for labor or parts.

• This warranty will not cover deterioration or malfunction resulting from accident, act of nature, abuse, misuse, neglect, unauthorized product repair, shipping of the product, opening of or modification or failure to follow instructions supplied with product.

• This warranty does not apply to any flashtubes, modeling lamps, batteries, or memory cards that may arrive with a product as these become exhausted based on normal use.

• The product must be returned to Paul C. Buff, Inc.™ for warranty service. For customers in the United States, warranty service includes return shipment via UPS ground to the original destination (where the equipment was sent to the original purchaser). Customers outside of the United States will be responsible for all shipping fees, duties, taxes and brokerage fees to ship the product to and from our offices.

• Paul C. Buff, Inc.™ IS NOT RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT, PUNITIVE OR CONSEQUENTIAL DAMAGES, LOST PROFITS, OR PRODUCTS LOST, STOLEN OR DAMAGED DURING SHIPPING, WHETHER ARISING IN CONTRACT, TORT (INCLUDING NEGLIGENCE), OR OTHERWISE. ALL LIABILITY OF Paul C. Buff, Inc. SHALL BE LIMITED TO THE REPAIR OR REPLACEMENT, AT OUR OPTION, OF ANY DEFECTIVE PRODUCT.

• THIS WARRANTY IS EXPRESSLY MADE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

• This warranty may not be altered other than in writing.

If you have questions about the guarantee or warranty, please contact our Customer Service Team on our **Toll Free line (1-800-443-5542)** or **local line (615-383-3982)**. We're here Monday through Friday, from 9:00 am to 5:00 pm, CT. You can also email our Customer Service Team at **info@paulcbuff.com**. For more information on our products and the various accessories that are compatible with the Einstein™ flash unit, visit our website at **www.paulcbuff.com**.

The EINSTEIN™ flash unit is a Paul C. Buff, Inc.™ product
2725 Bransford Avenue • Nashville, Tennessee • 37204 • U.S.A.• Toll Free 1-800-443-5542
www.PAULCBUFF.com